

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-039428 \*

(43)Date of publication of application : 19.02.1993

(51)Int.Cl.

C08L101/10

C08K 5/09

C08L 71/02

(21)Application number : 03-219271

(71)Applicant : ASAHI GLASS CO LTD \*

(22)Date of filing : 06.08.1991

(72)Inventor : YANASE KIYOKO  
WATABE TAKASHI  
OZAWA SHIGEYUKI

## (54) ROOM TEMPERATURE-CURABLE COMPOSITION

## (57)Abstract:

PURPOSE: TO provide a composition suitable as a sealing agent and curable in rubber-like state by water content.

CONSTITUTION: A room temperature-curable composition comprises (A) a hydrolyzable silicon group-containing polymer containing a hydrolyzable silicon group obtained by introducing SiCH<sub>3</sub>(OCH<sub>3</sub>)<sub>2</sub> group to the ends of a linear polyoxypropylenepolyol which is obtained by adding propylene oxide to an initiator such as glycerol and an organic carboxylic acid salt of bismuth compound of 1 pts.wt. based on 100 pts.wt component A, and a room temperature- curable composition further added thereto 0.3 pts.wt. caprylic acid or lauric amine. A cured product having excellent elongation is obtained therefrom.

## \* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\* shows the word which can not be translated.

3. In the drawings, any words are not translated.

---

CLAIMS

---

[Claim(s)]

[Claim 1] A hydrolytic silicon group content polymer (A) which contains one hydrolytic silicon group even if small per one molecule of polymers, and a room-temperature-curing nature constituent which contains ten or less weight sections of bismuth compounds (B) to (A)100 weight section.

[Claim 2] A hydrolytic silicon group content polymer (A) which contains one hydrolytic silicon group even if small per one molecule of polymers, (A) A room-temperature-curing nature constituent which contains acid or ten or less weight sections of alkalis (C) for a bismuth compound (B) to ten or less weight sections and (A)100 weight section to 100 weight sections.

[Claim 3] A room-temperature-curing nature constituent of claim 1 or claim 2 whose hydrolytic silicon group is a silicon functional group expressed with a following general formula.

$\text{--SiX}_a\text{R}_{3-a}$  (as for a univalent hydrocarbon group or a halogenated hydrocarbon group, and X, in the inside of a formula, and R, a hydrolytic basis and a are the integers of 1, 2, or 3)

[Claim 4] A room-temperature-curing nature constituent of claim 1 or claim 2 whose hydrolytic silicon group content polymers are the molecular weights 2000-50000.

[Claim 5] A room-temperature-curing nature constituent of claim 1 or claim 2 whose bismuth compound is an organic-carboxylic-acid salt of bismuth.

[Claim 6] A room-temperature-curing nature constituent of claim 5 whose organic-carboxylic-acid salt of bismuth is bismuth tris (2-ethylhexoate) or bismuth tris (neo decanoate).

[Claim 7] A room-temperature-curing nature constituent of claim 2 whose acid is organic carboxylic acid.

[Claim 8] A room-temperature-curing nature constituent of claim 2 whose alkali is organic amine.

---

[Translation done.]

---

## \* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]  
[Industrial Application]This invention relates to the room-temperature-curing nature constituent containing a hydrolytic silicon group content polymer.

[Description of the Prior Art]If exposed into 4 air moisture, the compound of the silicon functional group content organicity polymer which can be hardened to a rubber-like substance is used for a sealing material's etc. use.

[0003]On the other hand, it is already known that a bismuth compound is effective as a catalyst of urethane.

For example, it is indicated to JP,61-235420.A.

However, the example used as a curing catalyst of a hydrolytic silicon group content polymer is not known until now.

[0004]

[Problem(s) to be Solved by the Invention]As a catalyst which stiffens a hydrolytic silicon group content polymer at a room temperature conventionally, it is common to use the organic metal catalyst of tin and lead. However, these catalysts are catalysts suitable for urethane production, and are not enough, and development of a new curing catalyst is desired. [ of the elongation of the hardened material obtained when it is used as a curing catalyst of a hydrolytic silicon group content polymer ]

[0005]

[Means for Solving the Problem]A hydrolytic silicon group content polymer (A) which contains one hydrolytic silicon group even if this invention is made that the above-mentioned problem should be solved and it is small per one molecule of polymers. And a room-temperature-curing nature constituent which contains ten or less weight sections of bismuth compounds (B) to (A)100 weight section is provided.

[0006]A hydrolytic silicon group content polymer (A) which contains one hydrolytic silicon group even if there is little this invention per one molecule of polymers again, (A) Provide a room-temperature-curing nature constituent which contains acid or ten or less weight sections of alkalis (C) for a bismuth compound (B) to ten or less weight sections and (A)100 weight section to 100 weight sections.

[0007]This time, it newly became clear that a bismuth compound was dramatically effective as a curing catalyst in a room temperature of a hydrolytic silicon group content polymer as a result of examination. Elongation is improved and a hardenability constituent which uses a bismuth compound as a curing catalyst also has few problems of safety.

[0008]A reactant with organic carboxylic acid which it has 8-12 pieces preferably [ bismuth salt which is indicated to JP,61-235420.A as a bismuth compound used by this invention, and 2-20 carbon numbers ] is raised. Specifically, there are bismuth tris (neo decanoate), bismuth tris (2-ethylhexoate), etc.

[0009]The amount of bismuth compound used has ten or less weight sections of 0.01 to 3 especially preferably preferred weight sections 0.01 to 5 weight section.

[0010]In this invention, although a bismuth compound may be used independently, it can also be used together with acid or an alkali. Concomitant use with acid or an alkali has a hardening facilitatory

effect. When using acid or an alkali, ten or less weight sections of 0.001 to 5 weight sections are suitable for especially the amount used to a hydrolytic silicon group content polymer. It is 0.01 to 3 weight section most preferably.

[0011]Especially although organic acid or inorganic acid can be used as acid, an organic carboxylic acid compound is preferred. For example, acetic acid, propionic acid, caproic acid, caprylic acid, p-stearic acid, citrate, chloroacetic acid, acrylic acid, methacrylic acid, m-nitrobenzoic acid, or p-nitrobenzoic acid can usually use organic carboxylic acid of the carbon numbers 1-20. Solid acid, such as clay and aluminum silicate, can be used as inorganic acid.

[0012]Especially as an alkali, an organic amine compound's is preferred, and For example, diethylenetriamine, Triethylenetetramine, tetraethylenepentamine, a butylamine, Hexylamine, octyl amine, decyl amine, lauryl amine, Hexamethylenediamine, triethanolamine, dibutyl amine, Diethanolamine, N,N,N',N'-tetramethyl 1,3-butanediamine, Benzylamine, dimethylethylenediamine, dimethylamino ethanol, N,N,N',N'-tetramethylethylenediamine, triethylamine, N,N-dimethylaniline, dimethylbenzyl aniline, etc. can be used.

[0013]As a hydrolytic silicon group content polymer of this invention, various polymers which have one or more hydrolytic silicon groups among one molecule and in which a main chain consists of polyether or polyester intrinsically can be used. A compound specifically indicated in the following literature is mentioned.

[0014]For example, a hydrolytic silicon group content polymer which introduced a hydrolytic silicon group into JP,46-12514.B, JP,3-47825.A, and JP,3-72527.A by a method which is stated to an end of a polyoxyalkylene compound below is indicated.

[0015]A polymer of polyglycol which has at the end the hydrolytic silicon group which combined JP,45-36319.B by specific bond groups, or a polyester system is indicated.

[0016]To JP,3-79627.A, what introduced a hydrolytic silicon group into a copolymer of monoepoxide, such as alkylene oxide, and unsaturation machine content monoepoxide, such as allyl glycidyl ether, is indicated.

[0017]Furthermore, Alkylene oxide, such as propylene oxide, is added to hydroxyl group end polybutadiene. To a polymer obtained, a hydrolytic silicon group. A hydrolytic silicon group content polymer (refer to the Japanese-Patent-Application-No. No. 110588 [ two to ] specification in connection with application of these people) of the molecular weights 300-30000 can be used with a polymer chain which main chains, such as what was introduced, have the residue of liquid rubber and/or hydrogenation liquid rubber, and has a polyether chain.

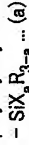
[0018]As for a main chain of a hydrolytic silicon group content polymer, what consists of polyoxyalkylene chain intrinsically or has polyoxyalkylene chain in a side chain is preferred. A hydrolytic silicon group content polymer introduces a hydrolytic silicon group into a compound which has such polyoxyalkylene chain and has a functional group, and is manufactured.

[0019]Polyoxyalkylene chain of a compound which has polyoxyalkylene chain, Monoepoxide, such as alkylene oxide, etc. are made to react to initiators, such as a polyhydroxy compound which has at least one hydroxyl group under existence of catalysts, such as an alkaline metal catalyst, a composite metal cyanide complex catalyst, and metalloporphyrin, and it is manufactured. As for a functional group number of a compound which has polyoxyalkylene chain, two or more are preferred, and 2 or 3 is especially preferred.

[0020]Especially a desirable compound is a compound which has a polyoxypropylene chain and has two pieces or three hydroxyl groups. Specifically, it is a propylene oxide adduct of polyoxypropylene diol, polyoxypropylene triol, liquid rubber, and/or hydrogenation liquid rubber, etc.

[0021]When using for a method of following (1), a polyoxyalkylene compound of olefin ends, such as an allyl end and polyoxypropylene monoar, can also be used.

[0022]As a hydrolytic silicon group introduced into a compound which has the above-mentioned polyoxyalkylene chain, a silyl group expressed with a general formula (a) is good.



[0023]The inside R of a formula is a univalent hydrocarbon group or a halogenated hydrocarbon group, and eight or less carbon number is six or less alkyl group and a fluoro alkyl group preferably. They are low-grade alkyl groups, such as a methyl group and an ethyl group, especially preferably.

[0024]X is a hydrolytic basis, for example, there are a halogen atom, an alkoxy group, an acyloxy group, an amide group, an amino group, an aminoxy group, a KETOKISHI mate group, etc. As for a carbon number of a hydrolytic basis which has a carbon atom among these, six or less are preferred,

and four especially or less are preferred. Desirable hydrolytic bases are a with a carbon number of four or less lower alkoxy group, especially a methoxy group and an ethoxy basis.

[0025]a is 1, 2, or 3 and it is preferred that it is especially 2 or 3.

[0026]As for a silyl group shown by a general formula (a), it is preferred to average in a total terminal group and to contain not less than 70% preferably not less than 50%.

[0027]Although a method in particular of introduction to a compound which has polyoxyalkylene chain of a silyl group shown by a general formula (a) is not limited, it can be introduced, for example by the following methods.

[0028](1) A method to which a hydrosilyl compound expressed with an end of a compound which has polyoxyalkylene chain by a general formula (b) that an olefin group was introduced is made to react.

[0029]HSX<sub>a</sub>R<sub>3-a</sub>... (b)

(the same as the above the inside R, X, and a of a formula)

[0030]As a method of introducing an olefin group here, A compound which has an unsaturation group and a functional group is made to react to terminal hydroxyl groups of a compound which has polyoxyalkylene. How to combine by ether bond, ester bond, a urethane bond, carbonate combination, etc., Or when polymerizing alkylene oxide, a method of introducing an olefin group into a side chain, etc. are mentioned by adding and carrying out copolymerization of the olefin group content epoxy compounds, such as allyl glycidyl ether.

[0031](2) A method to which a compound expressed with an end of a compound which has polyoxyalkylene by a general formula (c) is made to react.

[0032]

R<sub>3-a</sub>-SiX<sub>a</sub>-R<sup>1</sup>-NCO ... (c)

(It is the same as the above the inside R, X, and a of a formula.) R<sup>1</sup> is a divalent hydrocarbon group of the carbon numbers 1-17.

[0033](3) A method to which W basis of a silicon compound expressed with a general formula (d) to this isocyanate group is made to react after making polyisocyanate compounds, such as tolylene diisocyanate, react to an end of a compound which has polyoxyalkylene and considering it as an isocyanate group end.

[0034]R<sub>3-a</sub>-SiX<sub>a</sub>-R<sup>1</sup>W ... (d)

(The inside R of a formula, R<sup>1</sup>, X, and a are the same as the above.) Active hydrogen containing group as which W was chosen from a hydroxyl group, a carboxyl group, a sulfinyl group, and an amino group (the 1st class or the 2nd class).

[0035](4) A method which introduces an olefin group into an end of a compound which has polyoxyalkylene and to which the olefin group and a sulfinyl group of a silicon compound expressed with a general formula (d) whose W is a sulfinyl group are made to react.

[0036]If a hydrolytic silicon group content polymer in this invention contacts moisture, it will three-dimensionalize by crosslinking reaction, and it will be hardened.

[0037]As for a molecular weight of a hydrolytic silicon group content polymer in this invention, 2000-50000, especially 6000-50000 are preferred, and 16000-30000 are especially preferred.

[0038]The constituent of this invention can contain further various bulking agents, an additive agent, etc. Although general things, such as calcium carbonate, kaolin, talc, titanium oxide, aluminum silicate, or carbon black, are mentioned as a bulking agent, especially in order to speed up hardening, acid system bulking agents, such as kaolin and aluminum silicate, are preferred.

[0039]The amount used has the preferred range of zero to 300 weight section to hydrolytic silicon group content polymer 100 weight section.

[0040]As a plasticizer, a thing DOP (dioctyl phthalate), BBP (butylbenzyl phthalate), a chlorinated paraffin, epoxidized soybean oil, and usual [ other ] can use it in the range of zero to 200 weight section to hydrolytic silicon group content polymer 100 weight section.

[0041]Hydrogenation castor oil, a silicic acid anhydride, or organic bentonite is suitable for a dripping inhibitor. Various kinds of things according to which an antiaging agent is classified into an ultraviolet ray absorbent, radical chain inhibitor, or a peroxide decomposition agent --- it can be independent, or it can use together and can use.

[0042]a case where a room-temperature-curing nature constituent of this invention is used as for example, a structural sealing material --- one component type --- or it is applicable to both of the

molds 2 component types. When using one component type, this constituent is adjusted with non-watery voice by a kneader etc., and a container which can intercept moisture is stuffed and it manufactures. In the case of two component types, it separates into two and an ingredient which promotes hardening, and the other ingredient are manufactured.

[0043]

[Example]Although the example of manufacture, an example, and a comparative example are concretely given to below and this invention is explained to it, this invention is not limited to these.

[0044][The example of manufacture]

(Polymer A) The organic polymer which introduced the -SiCH<sub>3</sub>(OCH<sub>3</sub>)<sub>2</sub> group into the end of the linear polyoxypropylene polyol of the molecular weight 17000 to which dipropylene glycol was made to add propylene oxide by the method given in JP-3-72527A.

[0045](Polymer B) The organic polymer which introduced the -SiCH<sub>3</sub>(OCH<sub>3</sub>)<sub>2</sub> group into the end of the linear polyoxypropylene polyol of the molecular weight 22000 to which glycerin was made to add propylene oxide by the method given in JP-3-72527A.

[0046](Polymer C) The organic polymer which introduced the -SiCH<sub>3</sub>(OCH<sub>3</sub>)<sub>2</sub> group into the linear polyoxypropylene polyol of the molecular weight 10000 to which dipropylene glycol was made to add propylene oxide by the method given in JP-3-47825A.

[0047](Polymer D) By the method of a statement, to JP-2-110588A. The organic polymer which introduced the -SiCH<sub>3</sub>(OCH<sub>3</sub>)<sub>2</sub> group into the end of the conversion oxypropylene compound of the molecular weight 10000 which made propylene oxide add to hydrogenation polyisoprene system polyol (seapale made from the Idemitsu petrochemistry; the molecular weight 2400, the functional group number 2.2).

[0048]The example of the hardenability constituent prepared below using above-mentioned polymer A-D is shown. Examples 1-7 show an example and Example 8 shows a comparative example.

[0049]To polymer 100 weight sections each shown in Table 1, [Example 1] Calcium carbonate 140 weight section, After kneading DOP30 weight section, titanium oxide 20 weight section, hydrogenation castor oil 6 weight section, and antiaging agent 1 weight section by the system in which moisture does not exist substantially, one weight section of curing catalysts shown in Table 1 were added, it kneaded uniformly, and the hardenability constituent was obtained.

[0050][Examples 2-8] Except adding acid or alkali 0.3 weight section shown in Table 1 with a curing catalyst, the same operation as Example 1 was performed, and the hardenability constituent was obtained.

[0051]When H type specimen was produced according to JIS-5758 and it was recuperated for 14 days under 23 \*\* and 60% humidity atmosphere using the constituent obtained in Examples 1-8, the rubber-like elasticity object which hardened thoroughly to the inside in any case was acquired.

[0052]The result of having examined by pulling at the rate of 50 mm/min about these is shown in Table 1.

[0053]The result of having set these hardened materials in the state of 50 \*\* and 30% compression furthermore for 24 hours, and having canceled the set continuously, and having measured the recovery is collectively shown in Table 1.

[0054]The curing catalyst and acid which were used in Examples 1-8, and an alkali are as follows. (Curing catalyst)

Catalyst compound E: Bismuth tris (ethylhexanoate)

Catalyst compound F: Bismuth tris (neo decanoate)

Catalyst compound G: Octylic acid tin [0055](The acid or alkali)

acid: --- capryl lactam acid-base nature substance: --- lauryl amine [0056] [Table 1]

例	1	2	3	4	5	6	7	8
重合体の種類 触媒化合物の種類 酸性・塩基性物質	A	A	A	A	B	C	D	A
	E	E	E	F	E	E	E	G
	-	塩基	酸	塩基	塩基	塩基	塩基	塩基
引 張 強 度 (kg/cm <sup>2</sup> )	2.1	2.3	2.1	2.4	3.5	4.3	3.7	2.2
試 験 後新強度 (kg/cm <sup>2</sup> )	9.8	11.6	10.9	11.3	10.3	9.8	12.3	9.1
結 果 伸 び (%)	720	770	700	750	400	230	400	480
復 元 率 3時間後 (%)	84	87	83	87	93	95	90	86
24時間後 (%)	85	90	86	92	95	97	93	90

[0057]  
[Effect of the Invention]The hardenability constituent which has physical properties outstanding by this invention is obtained. Elongation is improved as compared with what uses a tin compound as a catalyst especially conventionally.

[Translation done.]

## \* NOTICES \*

JP0 and INPIIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\* shows the word which can not be translated.

3. In the drawings, any words are not translated.

## CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the regulation of 2 of Article 17 of Patent Law  
[Section classification] The 3rd classification of the part III gate  
[Publication date] July 27, Heisei 11 (1999)

[Publication No.] JP.5-39428.A

[Date of Publication] February 19, Heisei 5 (1993)

[Annual volume number] Publication of patent applications 5-395

[Application number] Japanese Patent Application No. 3-219271

[International Patent Classification (6th Edition)]

C08L 101/10 KAR

C08K 5/09

C08L 71/02 LOD

[F]

C08L 101/10 KAR

C08K 5/09

C08L 71/02 LOD

[Written amendment]

[Filing date] July 22, Heisei 10

[Amendment 1]

[Document to be Amended] Specification

[Item(s) to be Amended] Whole sentence

[Method of Amendment] Change

[Proposed Amendment]

[Document Name] Specification

[Title of the Invention] Room-temperature-curing nature constituent

[Claim(s)]

[Claim 1] A hydrolytic silicon group content polymer (A) which contains one hydrolytic silicon group even if small per one molecule of polymers, and a room-temperature-curing nature constituent which contains ten or less 0 weight-section super-weight sections of bismuth compounds (B) to (A)100 weight section.

[Claim 2] A hydrolytic silicon group content polymer (A) which contains one hydrolytic silicon group even if small per one molecule of polymers, (A) A room-temperature-curing nature constituent which contains acid or ten or less 0 weight-section super-weight sections of alkalis (C) for a bismuth compound (B) to less than super-10 weight sections and (A)100 weight section to 100 weight sections 0 weight section.

[Claim 3] The room-temperature-curing nature constituent according to claim 1 or 2 whose hydrolytic silicon group is a silicon functional group expressed with a following general formula.

- SIX R<sub>g</sub>-a

(As for a univalent hydrocarbon group or a halogenated hydrocarbon group, and X, in the inside of a formula, and R<sub>g</sub> a hydrolytic basis and a are the integers of 1, 2, or 3)

[Claim 4] Claim 1, the room-temperature-curing nature constituent according to claim 2 or 3 whose molecular weights of a hydrolytic silicon group content polymer (A) are 2000-50000.

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the room-temperature-curing nature constituent containing a hydrolytic silicon group content polymer.

[0002]

[Description of the Prior Art] If exposed into air moisture, the compound of the silicon functional group content organicity polymer which can be hardened to a rubber-like substance is used for a sealing material's etc. use.

[0003] On the other hand, it is already known that a bismuth compound is effective as a catalyst of urethane-izing.

For example, it is indicated to JP.61-235420.A.

However, the example used as a curing catalyst of a hydrolytic silicon group content polymer is not known until now.

[0004]

[Problem(s) to be Solved by the Invention] As a catalyst which stiffens a hydrolytic silicon group content polymer at a room temperature conventionally, it is common to use the organic metal catalyst of tin and lead. However, these catalysts are catalysts suitable for polyurethane manufacture, and are not enough, and development of a new curing catalyst is desired. [Of the elongation of the hardened material obtained when it is used as a curing catalyst of a hydrolytic silicon group content polymer]

[0005]

[Means for Solving the Problem] A hydrolytic silicon group content polymer (A) which contains one hydrolytic silicon group even if this invention is made that the above-mentioned problem should be solved and it is small per one molecule of polymers, And a room-temperature-curing nature constituent which contains ten or less 0 weight-section super-weight sections of bismuth compounds (B) to (A)100 weight section is provided.

[0006] A hydrolytic silicon group content polymer (A) which contains one hydrolytic silicon group even if there is little this invention per one molecule of polymers again, (A) Provide a room-temperature-curing nature constituent which contains acid or ten or less 0 weight-section super-weight sections of alkalis (C) for a bismuth compound (B) to less than super-10 weight sections and (A)100 weight section to 100 weight sections 0 weight section.

[0007] This time, it newly became clear that a bismuth compound was dramatically effective as a curing catalyst in a room temperature of a hydrolytic silicon group content polymer (A) as a result of examination. Elongation is improved and a hardenability constituent which uses a bismuth compound (B) as a curing catalyst also has few problems of safety.

[0008] A reactant with organic carboxylic acid which it has 8-12 pieces preferably [bismuth salt which is indicated to JP.61-235420.A as a bismuth compound (B) used by this invention, and 2-20 carbon numbers] is mentioned. Specifically, there are bismuth tris (neo decanoate), bismuth tris (2-ethylhexanoate), etc.

[0009] It is less than super-10 weight sections 0 weight section to hydrolytic silicon group content polymer (A) 100 weight section, the amount of bismuth compound (B) used has 0.01 - 5 preferred weight section, and especially its 0.01 - 3 weight section is preferred.

[0010] In this invention, although a bismuth compound (B) may be used independently, it can also be used together with acid or an alkali (C). Concomitant use with acid or an alkali (C) has a hardening facilitatory effect. When using acid or an alkali (C), the amount used is ten or less weight sections to hydrolytic silicon group content polymer (A) 100 weight section, and especially 0.001 - 5 weight section is suitable for it. It is 0.01 to 3 weight section most preferably.

[0011] Especially although organic acid or inorganic acid can be used as acid, an organic carboxylic acid, citrate, chloroacetic acid, acrylic acid, methacrylic acid, m-nitrobenzoic acid, or p-nitrobenzoic acid, can usually use organic carboxylic acid of the carbon numbers 1-20. Solid acid, such as clay and aluminum silicate, can be used as inorganic acid.



[0012] Especially as an alkali, an organic amine compound's is preferred, and For example, diethylenetriamine, Triethylenetetramine, tetraethylenepentamine, a butylamine, Hexylamine, octyl amine, decyl amine, lauryl amine, Hexamethylenediamine, triethanolamine, dibutyl amine, Diethanolamine, N,N,N',N'-tetramethyl 1,3-butanediamine, Benzylamine, dimethylethylenediamine, dimethylamino ethanol, N,N,N',N'-tetramethylethylenediamine, triethylamine, N,N-dimethylaniline, dimethylbenzyl aniline, etc. can be used.

[0013] As a hydrolytic silicon group content polymer (A) of this invention, various polymers which have one or more hydrolytic silicon groups among one molecule and in which a main chain consists of polyether or polyester intrinsically can be used. A compound specifically indicated in the following literature is mentioned.

[0014] For example, a hydrolytic silicon group content polymer which introduced a hydrolytic silicon group into JP 46-12514B, JP 3-47825A, and JP 3-72527A by a method which is stated to an end of a polyoxysilylene compound below is indicated.

[0015] A polymer of polyglycol which has at the end the hydrolytic silicon group combined with JP 45-36319B by specific bond groups, or a polyester system is indicated.

[0016] To JP 3-79627A, what introduced a hydrolytic silicon group into a copolymer of monoepoxide, such as alkylene oxide, and unsaturation group content monoepoxide, such as allyl glycidyl ether, is indicated.

[0017] Furthermore, Alkylene oxide, such as propylene oxide, is added to hydroxyl group and polybutadiene. To a polymer obtained, a hydrolytic silicon group. A hydrolytic silicon group content polymer (refer to the Japanese-Patent-Application-No. 110588 [two to ] specification in connection with application of these people) of the molecular weights 300-30000 can be used with a polymer chain which main chains, such as what was introduced, have the residue of liquid rubber and/or hydrogenation liquid rubber, and has a polyether chain.

[0018] As for a main chain of a hydrolytic silicon group content polymer (A), what consists of polyoxysilylene chain intrinsically or has polyoxysilylene chain in a side chain is preferred. A hydrolytic silicon group content polymer introduces a hydrolytic silicon group into a compound which has such polyoxysilylene chain and has a functional group, and is manufactured.

[0019] Polyoxysilylene chain of a compound which has polyoxysilylene chain. Monoepoxide, such as alkylene oxide, etc. are made to react to initiators, such as an alkaline metal catalyst, a composite metal hydroxyl group under existence of catalysts, such as an alkaline metal catalyst, a composite metal cyanide complex catalyst, and metalloporphyrin, and it is manufactured. As for a functional group number of a compound which has polyoxysilylene chain, two or more are preferred, and 2 or 3 is especially preferred.

[0020] Especially a desirable compound is a compound which has a polyoxypolyene chain and has two pieces or three hydroxyl groups. Specifically, it is a propylene oxide adduct of polyoxypolyene diol, polyoxypolyene triol, liquid rubber, and/or hydrogenation liquid rubber, etc.

[0021] When using for a method of following (1), a polyoxysilylene compound of olefin ends, such as an allyl end and polyoxypolyene monooar, can also be used.

[0022] As a hydrolytic silicon group introduced into a compound which has the above-mentioned polyoxysilylene chain, a silyl group expressed with a general formula (a) is good.

$$-\text{SiX}_a\text{R}_{3-a} \dots (a)$$

[0023] The inside R of a formula is a univalent hydrocarbon group or a halogenated hydrocarbon group, and eight or less carbon number is six or less alkyl group and a fluoro alkyl group preferably. They are low-grade alkyl groups, such as a methyl group and an ethyl group, especially preferably.

[0024] X is a hydrolytic basis, for example, there are a halogen atom, an alkoxy group, an acyloxy group, an amide group, an amino group, an aminoxy group, a KETOKISHI mate group, etc. As for a carbon number of a hydrolytic basis which has a carbon atom among these, six or less are preferred, and four especially or less are preferred. Desirable hydrolytic bases are a with a carbon number of four or less lower alkoxy group, especially a methoxy group and an ethoxy basis.

[0025] a is 1, 2, or 3 and it is preferred that it is especially 2 or 3.

[0026] As for a silyl group expressed with a general formula (a), it is preferred to average in a total terminal group and to contain not less than 70% preferably not less than 50%.

[0027] Although a method in particular of introduction to a compound which has polyoxysilylene chain of a silyl group expressed with a general formula (a) is not limited, it can be introduced, for example by the following methods.

[0028] (1) A method to which a hydrosilyl compound expressed with an end of a compound which has polyoxysilylene chain by a general formula (b) that an olefin group was introduced is made to react.

$$[\text{HSiX}]_n\text{R}_{3-n} \dots (b)$$

(the same as the above the inside R, X, and a of a formula)

[0030] As a method of introducing an olefin group here, A compound which has an unsaturation group and a functional group is made to react to terminal hydroxyl groups of a compound which has polyoxysilylene. How to combine by ether bond, ester bond, a urethane bond, carbonate combination, etc., Or when polymerizing alkylene oxide, a method of introducing an olefin group into a side chain, etc. are mentioned by adding and carrying out copolymerization of the olefin group content epoxy compounds, such as allyl glycidyl ether.

[0031] (2) A method to which a compound expressed with an end of a compound which has polyoxysilylene by a general formula (c) is made to react.

$$\text{R}_{3-a}-\text{SiX}_a-\text{R}^1-\text{NCO} \dots (c)$$

(It is the same as the above the inside R, X, and a of a formula.) R<sup>1</sup> is a divalent hydrocarbon group of the carbon numbers 1-17.

[0033] (3) A method to which W basis of a silicon compound expressed with a general formula (d) to this isocyanate group is made to react after making polyisocyanate compounds, such as tolylene diisocyanate, react to an end of a compound which has polyoxysilylene and considering it as an isocyanate group end.

$$[\text{R}_{3-a}-\text{SiX}_a-\text{R}^1\text{W}]_n \dots (d)$$

(The inside R of a formula, R<sup>1</sup>, X, and a are the same as the above.) Active hydrogen containing group as which W was chosen from a hydroxyl group, a carboxyl group, a sulfinyl group, and an amino group (the 1st class or the 2nd class).

[0035] (4) A method which introduces an olefin group into an end of a compound which has polyoxysilylene and to which the olefin group and a sulfinyl group of a silicon compound expressed with a general formula (d) whose W is a sulfinyl group are made to react.

[0036] If a hydrolytic silicon group content polymer (A) in this invention contacts moisture, it will three-dimension-ize by crosslinking reaction, and it will be hardened.

[0037] As for a molecular weight of a hydrolytic silicon group content polymer (A) in this invention, 2000-50000, especially 6000-50000 are preferred, and 16000-30000 are the most preferred.

[0038] The constituent of this invention can contain further various bulking agents, an additive agent, etc. Although general things, such as calcium carbonate, kaolin, talc, titanium oxide, aluminum silicate, or carbon black, are mentioned as a bulking agent, especially in order to speed up hardening, acid system bulking agents, such as kaolin and aluminum silicate, are preferred.

[0039] Although these are not indispensable, the amount of [ in case used of using it ] has a preferred range not more than super-300 weight sections 0 weight section to hydrolytic silicon group content polymer (A), 100 weight section.

[0040] As a plasticizer, a thing DOP (dioctyl phthalate), BBP (butylbenzyl phthalate), a chlorinated paraffin, epoxidized soybean oil, and usual [ other ] can use it in not more than super-200 weight sections 0 weight section to hydrolytic silicon group content polymer (A), 100 weight section.

[0041] Hydrogenation castor oil, a silicic acid anhydride, or organic bentonite is suitable for a dripping inhibitor. An antiaging agent is independent, or can use together and use various kinds of things classified into an ultraviolet ray absorbent, radical chain inhibitor, or a peroxide decomposition agent.

[0042] A case where a room-temperature-curing nature constituent of this invention is used as for example, a structural sealing material — one component type — or it is applicable to both of the molds 2 component types. When using one component type, this constituent is prepared by a kneader etc. according to non-watery voice, and a container which can intercept moisture is stuffed and it manufactures. In the case of two component types, it separates into two and an ingredient which promotes hardening, and the other ingredient are manufactured.

[0043]

[Example] Although the example of manufacture, an example, and a comparative example are concretely given to below and this invention is explained to it, this invention is not limited to these.

[0044] [The example of manufacture]

[Polymer A] The organic polymer which introduced the  $\text{-Si(CH}_3\text{)(OCH}_3\text{)}_2$  group into the end of the linear polyoxypropylene polyol of the molecular weight 17000 to which dipropylene glycol was made to add propylene oxide by the method given in JP.3-72527.A.

[0045][Polymer B] The organic polymer which introduced the  $\text{-Si(CH}_3\text{)(OCH}_3\text{)}_2$  group into the end of the linear polyoxypropylene polyol of the molecular weight 22000 to which glycerin was made to add propylene oxide by the method given in JP.3-72527.A.

[0046][Polymer C] The organic polymer which introduced the  $\text{-Si(CH}_3\text{)(OCH}_3\text{)}_2$  group into the linear polyoxypropylene polyol of the molecular weight 10000 to which dipropylene glycol was made to add propylene oxide by the method given in JP.3-47825.A.

[0047][Polymer D] By the method of a statement, to JP.2-110588.A. At the end of the conversion oxypropylene compound of the molecular weight 10000 to which hydrogenation polyisoprene system polyol (epaule made from the Idemitsu petrochemistry; the molecular weight 2400, the average functional group number 2.2) was made to add propylene oxide, a  $\text{-Si(CH}_3\text{)(OCH}_3\text{)}_2$  group. The introduced organic polymer.

[0048]The example of the hardenability constituent prepared below using above-mentioned polymer A-D is shown. Examples 1-7 show an example and Example 8 shows a comparative example.

[0049]To polymer 100 weight sections each shown in Table 1, [Example 1] Calcium carbonate 140 weight section, After kneading DOP30 weight section, titanium oxide 20 weight section, hydrogenation castor oil 6 weight section, and antiaging agent 1 weight section by the system in which moisture does not exist substantially, one weight section of curing catalysts shown in Table 1 were added, it kneaded uniformly, and the hardenability constituent was obtained.

[0050][Examples 2-8] Except adding acid or alkali 0.3 weight section shown in Table 1 with a curing catalyst, the same operation as Example 1 was performed, and the hardenability constituent was obtained.

[0051]When H type specimen was produced according to JIS-A5758 and it was recuperated for 14 days under 23 \*\* and 60% humidity atmosphere using the constituent obtained in Examples 1-8, the rubber-like elasticity object which hardened thoroughly to the inside in any case was acquired.

[0052]The result of having examined by pulling at the rate of 50 mm/min about these is shown in Table 1.

[0053]The result of having set these hardened materials in the state of 50 \*\* and 30% compression furthermore for 24 hours, and having canceled the set continuously, and having measured the recovery is collectively shown in Table 1.

[0054]The curing catalyst and acid which were used in Examples 1-8, and an alkali are as follows.  
(Curing catalyst)  
Catalyst compound E: Bismuth tris (2-ethylhexanoate)  
Catalyst compound F: Bismuth tris (neo decanoate)  
Catalyst-compound G: 2-ethylhexanoic acid tin  
[0055][The acid or alkali]  
Acid: Caprylic acid  
Alkali: Lauryl amine  
[0056]  
[Table 1]

例	1	2	3	4	5	6	7	8
重合体の種類 触媒化合物の種類 酸性・塩基性物質	A	A	A	A	B	C	D	A
	E	E	E	F	E	E	E	G
	—	塩基	酸	塩基	塩基	塩基	塩基	塩基
引張	2.1	2.3	2.1	2.4	3.5	4.3	3.7	2.2
50%モジュラス (kg/cm <sup>2</sup> )								
試験								
破断強度(kg/cm <sup>2</sup> )	9.8	11.6	10.9	11.3	10.3	9.8	12.3	9.1
結果								
伸び (%)	720	770	700	750	400	230	400	480
復元率								
3時間後 (%)	84	87	83	87	93	95	90	86
24時間後 (%)	85	90	86	92	95	97	93	90

[0057]

[Effect of the Invention]The hardenability constituent which has physical properties outstanding by this invention is obtained. Elongation is improved as compared with what uses a tin compound as a catalyst especially conventionally.

[Translation done.]